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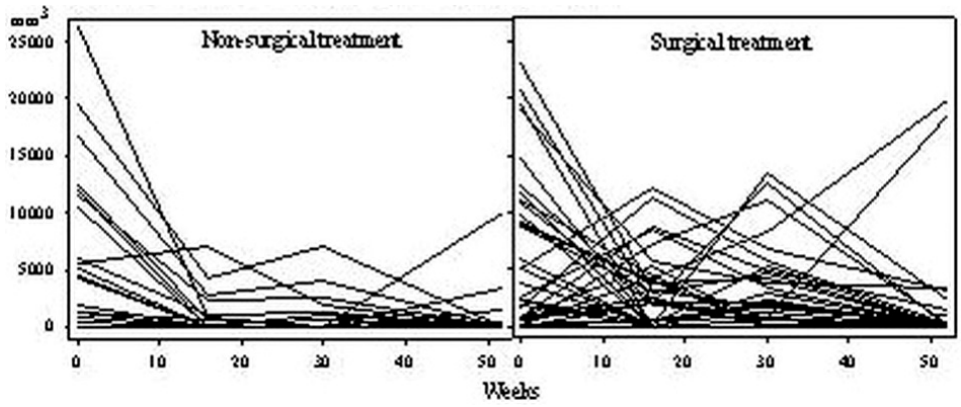

Fig. 2. First year development of BML volume (mm^3 in the medial tibial condyle. Each line represents one patient.

medial tibial condyle (p=0.020) and these differences persisted at 30 weeks ($p<0.001$ and p=0.012, respectively) (Fig. 1). There were no differences between the two groups at the 1 year follow up.

Plotting BML volume for each knee over time showed consistent differences between the two groups for all four regions, statistically significant in the medial tibial condyle (Fig. 2). None of the controls had, or developed any BML for any region throughout the one year period.

Conclusions: The majority of post traumatic BML seen in this study were resolved within the first year. However, the resolution of BML was delayed in surgically treated knees. Furthermore, a prolonged period of joint effusion was seen in ACL reconstructed knees as compared to non-surgically treated knees. The importance of these early differences for knee function or future risk of osteoarthritis is unclear. We continue to monitor post traumatic changes to the bone marrow, sub-chondral bone plate and cartilage following acute ACL injury within the KANON study.

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KNEE CARTILAGE MORPHOLOGY IN RELATION TO RADIOGRAPHIC OSTEOARTHRITIS STATUS: A CROSS-SECTIONAL STUDY USING 3 TESLA MR IMAGING

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Purpose: Quantitative MR imaging not only permits visualizing cartilage tissue directly, but also accurate determination of cartilage morphology three-dimensionally. Here we explore how measures of cartilage morphology differ between patients with various grades of radiographic OA and healthy control subjects.

Methods: 157 female participants, aged $\geq$ 40 years, were recruited at 7 clinical centers. Conventional standing AP knee radiographs were obtained to determine Kellgren Lawrence grades (KLG) by a central reader. 79 subjects had a BMI $\leq$ 28, no symptoms, and a KLG = 0 bilaterally. 78 subjects had a BMI $\geq$ 30, symptoms in at least one knee, and mild to moderate radiographic OA (16 = KLG 1, 35 = KLG 2, 27 = KLG 3). Coronal MR images were acquired using 3.0 Tesla scanners from two vendors and SPGRwe sequences at 1.0 x 0.31 x 0.31 mm^3 resolution. Cartilage volume (VC), mean cartilage thickness (ThC.Me), area of cartilage surface (AC), area of subchondral bone covered with cartilage (cAB), and total area of subchondral bone (tAB) were quantified in the medial tibia (MT), lateral tibia (LT), medial femoral condyle (cMF) and lateral femoral condyle (cLF) using proprietary software (Chondrometrics GmbH, Germany).

Results: The mean (SD) values for each cartilage morphometry parameter (not adjusted for BMI) in each of the 4 knee compartments studied for each of the 4 KLG groups are presented in Table 1.

Conclusions: 3.0 Tesla MR imaging provides quantitative measurements of cartilage morphology. Comparisons of cartilage morphometric parameters between KLG groups, adjusted for BMI using mixed effects models, showed that across compartments OA and non-OA subjects exhibit similar AC ($p > 0.05$), and observed VC differences are related to ThC.Me differences.

P280 – Table 1. Observed means (SDs) of cartilage morphometry parameters

		cLF	LT	cMF	MT
ThC.Me	KLG 0	1.67 (0.23)	2.01 (0.25)	1.73 (0.23)	1.62 (0.18)
(mm)	KLG 1	1.86 (0.26)	2.02 (0.31)	1.74 (0.23)	1.64 (0.13)
	KLG 2	1.87(0.24)	1.98 (0.31)	1.82 (0.28)	1.76 (0.16)
	KLG 3	1.79 (0.32)	1.87 (0.28)	1.54 (0.25)	1.59 (0.21)
VC	KLG 0	1011.4 (180.4)	1940.7 (362.4)	990.1 (172.4)	1786.7 (318.3)
(mm3)	KLG 1	1158.1 (249.0)	2074.5 (537.0)	1011.4 (170.9)	1885.2 (275.6)
	KLG 2	1156.3 (181.1)	2000.6 (363.8)	1090.2 (199.7)	2046.5 (291.4)
	KLG 3	1115.0 (241.9)	1849.2 (350.9)	920.6 (201.7)	1829.6 (329.8)
(AC+cAB)/2	KLG 0	613.8 (67.7)	984.0 (105.0)	577.0 (67.9)	1108.9 (108.7)
(mm2)	KLG 1	628.4 (74.7)	1033.7 (140.7)	587.6 (56.7)	1162.9 (111.8)
	KLG 2	625.0 (68.5)	1022.9 (116.8)	605.1 (68.7)	1181.4 (106.6)
	KLG 3	626.8 (71.5)	1004.6 (105.6)	592.4 (83)	1160.5 (112.6)
tAB	KLG 0	576 (65)	930 (101)	528 (66)	1081 (106)
(mm2)	KLG 1	588 (70)	979 (130)	539 (54)	1133 (109)
	KLG 2	583 (69)	974 (108)	553 (66)	1151 (102)
	KLG 3	587 (68)	954 (108)	555 (76)	1128 (110)